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Our Case No. 9821-4242
Client Reference No. J US99849

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Atsushi Masuda

Serial No.: Not Yet Assigned

Filing Date: Herein

For: MOTOR DEVICE WHEREIN ACCURATE SIZING IS POSSIBLE

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to examination of the application, please amend the application as follows:

In the Drawings

Applicant has enclosed a corrected version of Figs. 1, 2, and 10 with corrections marked in red. Applicant requests that the Examiner approve the corrections and will submit formal drawings upon receiving a Notice of Allowance.

In the Specification

Before the first paragraph insert --This application is a continuation application of U.S. Application Serial No. 09/625,833 filed on July 26, 2000, entitled "MOTOR DEVICE WHEREIN ACCURATE SIZING IS POSSIBLE".--

Please rewrite the paragraph on page 1, lines 12-21, as follows:

The bearing unit 50 includes a cylindrical bearing 51 and a flange 53 provided integrally with the periphery of the cylindrical bearing 51. The flange 53 is provided with U-shaped grooves 54 at the longitudinal ends of the flange 53 for positioning the

bearing unit 50 on a mounting base. The flange 53 is also provided on an upper face 53a thereof with a pair of rectangular projections 55 at one of the longitudinal ends provided with the grooves 54 of the flange 53. The cylindrical bearing 51, the flange 53, and the projections 55 are integrally formed with each other by a method, such as by die-casting or sintering.

Please rewrite the paragraph on page 8, lines 12-22, as follows:

A motor device 1 shown in Fig. 1 includes a base 7 made of, for example, a metallic plate, the base 7 being laminated with a printed-circuit board (PCB) 8 having predetermined electrode patterns formed on a glass epoxy substrate. The base 7 is provided thereon with a bearing unit 10 at the rotational center of the disk. A rotational shaft 14 is inserted into and is supported by the bearing unit 10. A circular rotor 15 having a shape of a downwardly-disposed tray is fixed to the rotational shaft 14, the rotor 15 being rotatable integrally with the rotational shaft 14.

Please rewrite the paragraph on page 8, line 25 to page 9, line 3 as follows:

The bearing unit 10 is provided with a core unit 16 including a plurality of iron cores 16b extending in the radial directions, the cores 16b included in the core unit 16 being provided with coils 17. A thrust block 19 is fixed to the base 7 at the bottom end of the rotational shaft 14. The rotational shaft 14 rotates slidingly on the thrust block 19.

Please rewrite the paragraph on page 13, lines 3-19, as follows:

A bearing unit 20 shown in Figs. 5 and 6 has the same external shape as that of the bearing unit 10. The bearing unit 20 includes a cylindrical bearing 21 and a flange 22 formed independently and assembled with each other. The cylindrical bearing 21 is formed of a cylindrical substance made of any one of a resin, a metal, and a sintered alloy, and includes a coupling hole 21a. The cylindrical bearing 21 is preferably an oil retaining bearing in the same fashion as in the cylindrical bearing 51 used in the motor device according to the first embodiment. The flange 22 is disposed extending from the lower periphery of the cylindrical bearing 21 along the same base 7 as shown in Fig. 1. A bottom face 22b of the flange 22 is formed perpendicular to the rotational axis of the rotational shaft 14. An upper face 22a of the flange 22 is inclined by an angle β with respect to the bottom face 22b (see Fig.

6). The flange 22 is disposed around the cylindrical bearing 21 and is fixed thereto by a method such as press-fitting or bonding.

Please rewrite the paragraph on page 13, lines 20-25, as follows:

When manufacturing the bearing unit 20, a sizing process of the coupling hole 21a of the bearing 21 is performed before the flange 22 is fixed to the cylindrical bearing 21. In the sizing process, the outer periphery of the cylindrical bearing 21 is used as a reference by disposing the cylindrical bearing 21 on a given plane surface or by supporting the same at the periphery.

Please rewrite the paragraph on page 14, lines 7-14, as follows:

Figs. 7 to 10 show a bearing unit used in a motor device 2 according to a third embodiment of the present invention. Fig. 7 is a perspective view of the bearing unit. Fig. 8 is a plan view of the same. Fig. 9 is an illustration of the bearing unit shown in Fig. 8, a critical portion thereof being shown in section along line IX-IX. Fig. 10 is a sectional view of a critical portion of the motor device 2.

Please rewrite the paragraph on page 14, lines 15-23, as follows:

A bearing unit 30 shown in Figs. 7 to 9 includes a cylindrical bearing 31 formed of a cylindrical substance and includes a coupling hole 31a. A flange 32 is disposed around the lower periphery of the cylindrical bearing 31 extending along a base (not shown). The cylindrical bearing 31 and the flange 32 made of a sintered alloy or the like being formed integrally with each other in the same fashion as in the bearing unit 10. U-shaped grooves 3 shown in the drawings have the same shape and function as those of the bearing units 10 and 20.

Please rewrite the paragraph on page 15, lines 8-13, as follows:

The core unit 16 and a PCB 8 must be positioned in relation to a Hall element (not shown). Hall elements are typically formed in the shape of a thin plate by a material having a large Hall constant and a small temperature dependency, such as germanium, and are used for performing measurements or calculations by utilizing the Hall effect. Therefore, a positioning member 34 is used for positioning, as shown in Fig. 10. The cylindrical positioning member 34 is made of a resin or metal, and is provided with a collar 35 formed integrally with the position member 34.

Please rewrite the paragraph on page 17, lines 5-13, as follows:

According to the above-described three embodiments, the core unit 16 is supported inclined when the bearing unit 10, 20, or 30, respectively, is mounted on the motor device according to the present invention, whereby the rotational shaft 14 and the rotor 15 are inclined (as shown with respect to the first embodiment), thereby urging the rotational shaft 14 to one side of the coupling hole 11a, 21a, or 31a, respectively. With this arrangement, decentering of the rotational shaft 14 is prevented, whereby an accurate on-tracking control is possible, thereby preventing tracking errors.

In the Claims

Please rewrite Claims 1-4 and add new Claims 5-9 as follows:

1. (Amended) A motor device comprising:

a base;

a bearing unit fixed on the base;

a core unit including a plurality of cores which extend in a radial direction from the bearing unit along an upper surface of the base and coils provided around each of the plurality of cores, the core unit integrally forming the plurality of cores;

a rotational shaft having two ends, one end of the rotational shaft rotatably supported by the bearing unit;

a rotor fixed to the other end of the rotational shaft; and

a magnet fixed to the rotor and opposing the core unit,

wherein the bearing unit includes a shaft supporter having a cylindrical shape which rotatably supports the rotational shaft, a flange formed integrally with the shaft supporter, extending along the upper surface of the base, and having an approximately uniform thickness, and a spacer disposed on the flange independently of the shaft supporter and of the flange and having an inclined surface that is inclined with respect to the upper surface of the base, and

wherein the core unit is disposed on the inclined surface of the spacer, whereby the core unit is supported by the inclined surface such that the core unit is inclined with respect to the upper surface of the base.

2. (Amended) A motor device comprising:

a base;

a bearing unit fixed on the base;

a core unit including a plurality of cores which extend in a radial direction from the bearing unit along an upper surface of the base and coils provided around each of the plurality of cores, the core unit integrally forming the plurality of cores;

a rotational shaft having two ends, one end of the rotational shaft rotatably supported by the bearing unit;

a rotor fixed to the other end of the rotational shaft; and

a magnet fixed to the rotor and opposing the core unit,

wherein the bearing unit includes an individual flange attached to a bearing at the periphery thereof, the flange having a bottom surface forming a surface perpendicular to an axis of the rotational shaft and an upper surface inclined with respect to the bottom surface and to the upper surface of the base, and

wherein the core unit is disposed on the inclined upper surface of the flange, whereby the core unit is supported and inclined with respect to the upper surface of the base.

3. (Amended) A motor device comprising:

a base;

a bearing unit fixed on the base;

a core unit including a plurality of cores which extend in a radial direction from the bearing unit along an upper surface of the base and coils provided around each of the plurality of cores, the core unit integrally forming the plurality of cores; a rotational shaft having two ends, one end of the rotational shaft rotatably supported by the bearing unit;

a rotor fixed to the other end of the rotational shaft; and

a magnet fixed to the rotor and opposing the core unit,

a positioning member fixed on the base to position the core unit on the base, and a supporting member formed integrally with the positioning member and extending along the upper surface of the base,

wherein the bearing unit includes a shaft supporter having a cylindrical shape which rotatably supports the rotational shaft, and a flange extending from the

shaft supporter along the upper surface of the base and having an approximately uniform thickness,

wherein an upper surface of the supporting member is formed at a position higher than an upper surface of the flange with respect to the upper surface of the base, and

wherein the core unit is supported by the upper surface of the flange and the upper surface of the supporting member such that the core unit is inclined with respect to the upper surface of the base by being disposed on the upper surface of the flange and the upper surface of the supporting member.

4. (Amended) A motor device according to Claim 3, wherein the flange is provided with a concavity, and wherein the supporting member is disposed on a bottom surface of the concavity in the bearing unit and is supported by the flange.

5. (New) A motor device according to Claim 3, wherein the positioning member is inserted through a hole formed in the core unit, and positions the core unit at a predetermined position above the base.

6. (New) A motor device according to Claim 5, wherein the positioning member is provided with a collar formed integrally with the positioning member and extending independently of the supporting member along the upper face of the base, and wherein the positioning member is inserted through the hole in the core unit and through a hole formed in the base and is fixed to the base, the collar being restrained by the base.

7. (New) A motor device according to Claim 1, wherein the shaft supporter and the flange are integrally formed of a zinc alloy from a die-cast method.

8. (New) A motor device according to Claim 1, wherein the shaft supporter and the flange are integrally formed of a metallic powder from a sintering method.

9. (New) A motor device according to Claim 2, wherein the bearing is formed by any one of materials selected from resin, metal, and sintered metal.

REMARKS

Applicant has amended portions of the specification, amended Claims 1-4, and added new Claims 5-9. No new matter has been added as a result of the amendment. Changes are shown in Appendix A with underlining for additions and strikethrough for deletions.

Conclusion

In view of the amendments above, Applicant respectfully submits that all of the pending claims are in condition for allowance and seeks an early allowance thereof. If for any reason the Examiner is unable to allow the application in the next Office Action and believes that a telephone interview would be helpful to resolve any remaining issues, he is respectfully requested to contact the undersigned attorneys.

Respectfully submitted,

Gustavo Siller, Jr.
Registration No. 32,305
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

APPENDIX A
Docket No. 9281/4142
MOTOR DEVICE WHEREIN ACCURATE SIZING IS POSSIBLE
Atsushi Masuda

In the Specification

Please amend the paragraph on page 1, lines 12-21, as follows:

The bearing unit 50 includes a cylindrical bearing 51 and a flange 53 provided integrally with the periphery of the cylindrical bearing 51. The flange 53 is provided with U-shaped grooves 54 at the longitudinal ends of the flange 53 for positioning the bearing unit 50 on a mounting base. The flange 53 is also provided on an upper face 53a thereof with a pair of rectangular projections 55 at one of the longitudinal ends provided with the grooves 54 of the flange 53. The cylindrical bearing 51, the flange 53, and the ~~protrusions~~ projections 55 are integrally formed with each other by a method, such as by die-casting or sintering.

Please amend the paragraph on page 8, lines 12-22, as follows:

A motor device 1 shown in Fig. 1 includes a base 7 made of, for example, a metallic plate, the base 7 being laminated with a printed-circuit board (PCB) 8 having predetermined electrode patterns formed on a glass epoxy substrate. The base 7 is provided thereon with a bearing unit 10 at the rotational center of the disk. A rotational shaft 14 is inserted into and is supported by the bearing unit 10. A circular rotor 15 having a shape of a downwardly-disposed tray is fixed to the rotational shaft 14, the rotor 15 being rotatable integrally with the rotational shaft 14.

Please amend the paragraph on page 8, line 25 to page 9, line 3 as follows:

The bearing unit 10 is provided with a core unit 16 including a plurality of iron cores 16b extending in the radial directions, the cores 16b included in the core unit 16 being provided with coils 17. A thrust block 19 is fixed to the base 7 at the bottom end of the rotational shaft 14. The rotational shaft 14 rotates slidingly on the thrust block 19.

Please amend the paragraph on page 13, lines 3-19, as follows:

A bearing unit 20 shown in Figs. 5 and 6 has the same external shape as that of the bearing unit 10. The bearing unit 20 includes a cylindrical bearing 21 and a

flange 22 formed independently and assembled with each other. The cylindrical bearing 21 is formed of a cylindrical substance ~~is~~ made of any one of a resin, a metal, and a sintered alloy, and includes a coupling hole 21a. The cylindrical bearing 21 is preferably an oil retaining bearing in the same fashion as in the cylindrical bearing 51 used in the motor device according to the first embodiment. The flange 22 is disposed extending from the lower periphery of the cylindrical bearing 21 along the same base 7 as shown in Fig. 1. A bottom face 22b of the flange 22 is formed perpendicular to the rotational axis of the rotational shaft 14. An upper face 22a of the flange 22 is inclined by an angle β with respect to the bottom face 22b (see Fig. 6). The flange 22 is disposed around the cylindrical bearing 21 and is fixed thereto by a method such as press-fitting or bonding.

Please amend the paragraph on page 13, lines 20-25, as follows:

When manufacturing the bearing unit 20, a sizing process of the coupling hole 21a of the bearing 21 is performed before the flange 22 is fixed to the cylindrical bearing 21. In the sizing process, the outer periphery of the cylindrical bearing 21 is used as a reference by disposing the cylindrical bearing 21 on a given plane surface or by supporting the same at the periphery.

Please amend the paragraph on page 14, lines 7-14, as follows:

Figs. 7 to 10 show a bearing unit used in a motor device 2 according to a third embodiment of the present invention. Fig. 7 is a perspective view of the bearing unit. Fig. 8 is a plan view of the same. Fig. 9 is an illustration of the bearing unit shown in Fig. 8, a critical portion thereof being shown in section along line IX-IX. Fig. 10 is a sectional view of a critical portion of the motor device 2.

Please amend the paragraph on page 14, lines 15-23, as follows:

A bearing unit 30 shown in Figs. 7 to 9 includes a cylindrical bearing 31 formed of a cylindrical substance and includes a coupling hole 31a. A ~~a~~ flange 32 is disposed around the lower periphery of the cylindrical bearing 31 extending along a base (not shown~~),~~). ~~the~~ The cylindrical bearing 31 and the flange 32 made of a sintered alloy or the like being formed integrally with each other in the same fashion

as in the bearing unit 10. U-shaped grooves 3 shown in the drawings have the same shape and function as those of the bearing units 10 and 20.

Please amend the paragraph on page 15, lines 8-13, as follows:

The core unit 16 and a PCB 8 must be positioned in relation to a Hall element (not shown). Hall elements are typically formed in the shape of a thin plate by a material having a large Hall constant and a small temperature dependency, such as germanium, and are used for performing measurements or calculations by utilizing the Hall effect. Therefore, a positioning member 34 is used for positioning, as shown in Fig. 10. The cylindrical positioning member 34 is made of a resin or metal, and is provided with a collar 35 formed integrally with the position member 34.

Please amend the paragraph on page 17, lines 5-13, as follows:

According to the above-described three embodiments, the core unit 16 is supported inclined when the bearing unit 10, 20, or 30, respectively, is mounted on the motor device according to the present invention, whereby the rotational shaft 14 and the rotor 15 are inclined (as shown with respect to the first embodiment), thereby urging the rotational shaft 14 to one side of the coupling hole 11a, 21a, or 31a, respectively. With this arrangement, decentering of the rotational shaft 14 is prevented, whereby an accurate on-tracking control is possible, thereby preventing tracking errors.

In the Claims

Please amend Claims 1-4 as follows:

1. (Amended) A motor device comprising:

a base;

a bearing unit fixed ~~to~~ on the base;

a core unit including ~~coils provided around~~ a plurality of cores ~~to be fixed to~~ which extend in a radial direction from the bearing unit along an upper surface of the base ~~side~~ and coils provided around each of the plurality of cores, the core unit integrally forming the plurality of cores;

a rotational shaft having two ends, one end of the rotational shaft rotatably supported by the bearing unit;

a rotor fixed to the other end of the rotational shaft; and

a magnet fixed to the rotor and opposing the core unit,

wherein the bearing unit includes a shaft supporter having a cylindrical shape which rotatably supports the rotational shaft, a flange formed integrally with the shaft supporter, extending along the upper surface of the base, and having an approximately uniform thickness, and a spacer disposed on the flange independently of the shaft supporter and of the flange and having an inclined surface that is inclined with respect to the upper surface of the base, and

wherein the core unit is ~~placed~~ disposed on the inclined surface of the spacer, whereby the core unit is ~~disposed~~ supported by the inclined surface such that the core unit is inclined with respect to ~~an~~ the upper surface of the base.

2. (Amended) A motor device comprising:

a base;

a bearing unit fixed ~~to~~ on the base;

a core unit including ~~coils provided around~~ a plurality of cores which extend in a radial direction from the bearing unit along an upper surface of ~~to be fixed to~~ the base ~~side~~and coils provided around each of the plurality of cores, the core unit integrally forming the plurality of cores;

a rotational shaft having two ends, one end of the rotational shaft rotatably supported by the bearing unit;

a rotor fixed to the other end of the rotational shaft; and

a magnet fixed to the rotor and opposing the core unit,

wherein the bearing unit includes an individual flange ~~mating with~~attached to a bearing at the periphery thereof, the flange having a bottom surface forming a surface perpendicular to an axis of the rotational shaft and an upper surface inclined with respect to the bottom surface and to the upper surface of the base, and

wherein the core unit is ~~placed~~ disposed on the inclined upper surface of the flange, whereby the core unit is ~~disposed~~ supported and inclined with respect to ~~an~~ upper ~~face~~surface of the base.

3. (Amended) A motor device comprising:

a base;

a bearing unit fixed ~~to~~ on the base;

a core unit including ~~coils provided around~~ a plurality of cores ~~to be fixed to~~ which extend in a radial direction from the bearing unit along an upper surface of the base ~~side~~ and coils provided around each of the plurality of cores, the core unit integrally forming the plurality of cores;

a rotational shaft having two ends, one end of the rotational shaft rotatably supported by the bearing unit;

a rotor fixed to the other end of the rotational shaft; and

a magnet fixed to the rotor and opposing the core unit,

~~further comprising~~ a positioning member fixed on the base to position ~~for positioning~~ the core unit on the base, and a supporting member formed integrally with the positioning member and extending along the upper surface of the base,

wherein the bearing unit includes a shaft supporter having a cylindrical shape which rotatably supports the rotational shaft, and a flange extending from the shaft supporter along the upper surface of the base and having an approximately uniform thickness,

wherein an upper surface of the supporting member is formed at a position higher than an upper surface of the flange with respect to the upper surface of the base, and

wherein the core unit is ~~disposed~~ supported by the upper surface of the flange and the upper surface of the supporting member such that the core unit is inclined with respect to the upper surface of the base by being ~~supported by~~disposed on the upper surface of the flange and the ~~bearing unit and an~~ upper surface of the supporting member.

4. (Amended) A motor device according to Claim 3, wherein the flange is provided with a concavity, and wherein the supporting member is disposed on a bottom surface of the concavity in the bearing unit and is supported by the ~~bearing unit at a bottom surface of the supporting member~~flange.

FIG. 1

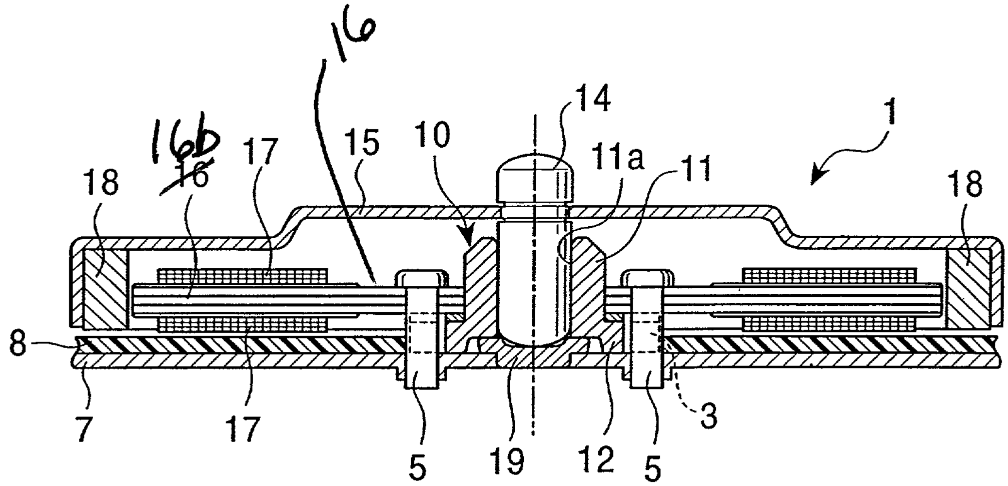
16
16b
16
17
15
10
14
11a
11
1
18
18
8
7
17
5
19
12
5
3

FIG. 2

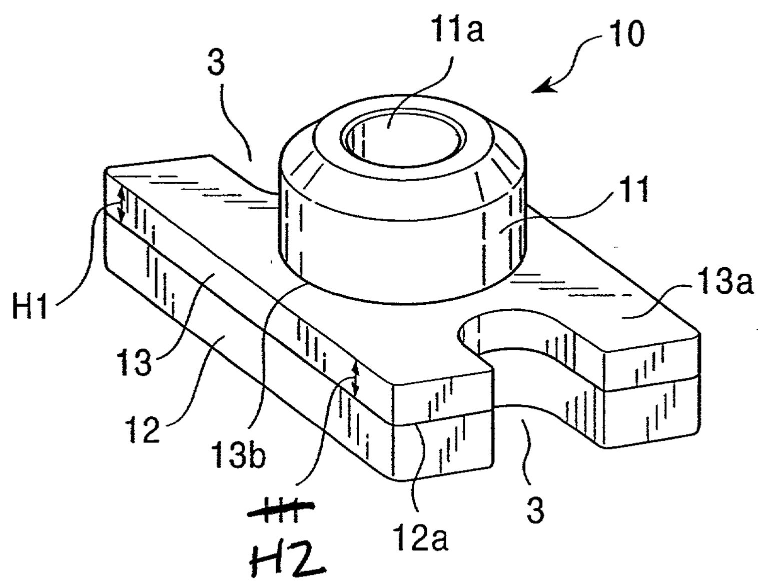
11a
10
3
11
13a
H1
13
12
13b
H1
H2
12a
3

FIG. 9

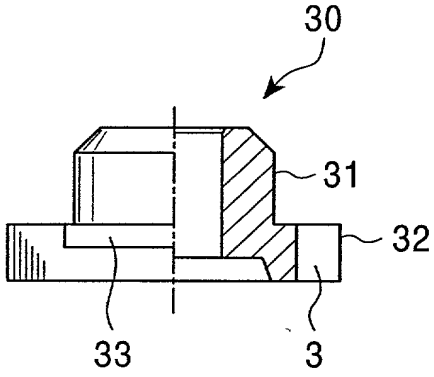

FIG. 10